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POLYTAENIA ALBIFLORA (APIACEAE), A NEW SPECIES FROM THE BALCONES CANYONLANDS IN THE EDWARDS PLATEAU OF TEXAS

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ABSTRACT

A new species of *Polytaenia* is described from the Balcones Canyonlands Subregion of the Edwards Plateau of Texas. **Polytaenia albiflora** E.L. Keith, **sp. nov.**, is described, illustrated, and distinguished from *Polytaenia nuttallii* and *Polytaenia texana*. The combined characteristics of white flowers, lack or reduction of involucel bracts, larger schizocarps, and unique habitat distinguish this species from the other two species of *Polytaenia*. The apparent rarity of *P. albiflora* warrants its consideration as a candidate for state and federal regulatory protection. Included is a species key and distribution map for the genus in Texas.

KEY WORDS: Apiaceae, Apioideae, *Polytaenia albiflora, Polytaenia nuttallii, Polytaenia texana*, Balcones Canyonlands

In April 2012, an unusual population of *Polytaenia* DC. was discovered near the base of a mature forested bluff approximately 30 meters from the Frio River on a recent land acquisition in Garner State Park (McKorkle 2010). This discovery was made while conducting vegetation and fuel model assessments for the park as part of a multi-year research project to acquire baseline data and conduct long-term monitoring of the natural vegetation communities in all of the state parks in Texas (TPWD 2010).

With an extensive search, only fifteen plants (ten in flower) were observed in the Garner State Park location. Only one plant (the type) was collected in April because of the small population size. Nearly mature fruit and fully mature fruit from two adjacent plants were subsequently collected by Mike Lloyd, Texas Parks and Wildlife Department (TPWD) State Parks Wildland Fire Management Specialist, at two different times in May and June 2012.

The plants appeared distinctive because of the white flowers and unique habitat in the shade of a mature forest canopy. After examination of numerous herbarium specimens of potentially close relatives and literature study of Apiaceae, the plant aspect, leaf structure, floral structure, and schizocarp morphology revealed that this novelty represented a new species in *Polytaenia* (Correll & Johnston 1970; Coulter & Rose 1900, 1909; Diggs et al. 1999; Hatch et al. 1990; Jones et al. 1997; Kartesz 2012; Menglan et al. 2005; Michigan Flora Online 2011; Nesom 2012; St. John 1919; Turner et al. 2003; USDA 2012; and Tutin et al. 2010).

POLYTAENIA ALBIFLORA E.L. Keith, **sp. nov.** (Figs. 1 and 2) **TYPE: USA. Texas**. Uvalde Co.: Wooded slope at base of Old Baldy, ca. 30 meters S of Frio River just above normal flood zone; associates *Celtis reticulata, Tilia caroliniana, Juniperus ashei, Fraxinus texensis, Ungnadia speciosa, Aesculus pavia* var. *flavescens, Sophora affinis, Tinantia anomala, Carex edwardensis, Dichanthelium pedicellatum, Parietaria pennsylvanica, Viguiera dentata,* and *Salvia roemeriana*; UTM NAD 83: 3272091.776 E, 429492.465 N; 19 Apr 2012, *Eric L. Keith 1028* (holotype: TEX).

Polytaenia albiflora is similar to *P. texana* (Coult. & Rose) Mathias & Constance in overall aspect, leaf arrangement, similar floral structure, dorsally flattened schizocarp with lateral ribs corky thickened into wings, four distinct and raised oil tubes on the dorsal surface of the mericarp, and two distinct and raised oil tubes on the commissural face. It differs in its white flowers, shorter stature, usually larger schizocarps, less dissected leaves, generally wider cauline leaflets, and reduced lanceolate involucel bracts or bracts often absent.

Perennial herbs, without odor, moderately to densely scabrous in the inflorescence with minute, conic, papillate hairs, otherwise glabrous; taproot apparently thickened. **Stems** 6–8 dm. **Leaves**: basal 1–2-pinnately compound, cauline 1-pinnately compound, blades oblong to ovate in outline, 8–17 cm x 8–12 cm, herbaceous and slightly thickened; leaflets 3–5, pinnately to subpinnately divided, lobes ovate or oblanceolate to narrowly oblong, 2–3 cm x 1–2 cm, cauline leaves smaller than basal leaves; bases rounded to cuneate, sessile to petiolulate, margins coarsely serrate; petioles with dilated and densely hispid, scabrous sheaths. **Inflorescence**: peduncles terminal and axillary, 1–6 cm; rays 1–2 cm, subequal to unequal. **Umbels** compound; umbellets 6–15; involucral bracts absent, involucel bracts often absent, but occasionally with 1 to 3 lanceolate bractlets to 3 mm long with slightly keeled, green to yellowish-green dorsal stripes and white hyaline margins. **Pedicels** 1–4 mm. **Flowers** protogynous; sepals lanceolate-subulate, persistent; petals white, apices extended into an appendage half as long as the petal and folded under and often adnate to the abaxial surface, deciduous; stylopodium absent. **Schizocarps** oval to slightly obovate, strongly flattened dorsally, (9–)11–15 mm x (6–)7–9.5 mm, splitting into 2 mericarps, narrowly to broadly corky-winged, dorsal ribs distinct, 3, thin, orange or tan; lateral ribs developing into wings that are relatively thin and same thickness as the face; oil tubes of dorsal face 4, raised and distinct; oil tubes of commissural face 2, slightly raised and less distinct that dorsal oil tubes, one on each side of the midrib, surface smooth, glabrous; carpophore bifid.

Additional collections examined: **USA. Texas.** Bandera Co.: Rock crevice, roots fleshy and brittle, head of Sabinal Canyon, 21 Jun 1946, *Correll & Correll 12828* (BRIT); Hill Country State Natural Area: Southeast area of park, near Chapa's group camp site, banks of West Verde Creek, 16 Apr 1994, *Lackey 457* (BRIT). Comal Co.: Honey Creek Preserve, ca. 100 m S of the confluence of the Guadalupe River and Honey Creek, limestone cliff above creek with *Diospyros texana* and *Forestiera*, rare perennial to 1 m, corolla white, 17 May 1984, *Poole 2555* (TEX). Gillespie Co.: Enchanted Rock, [no date], *Jermy s.n.* (BRIT). Kendall Co.: In moderately dry shady soil below Edge Falls, 3 May 1947, *Tharp, Webster, & Barkley 17T158* (TEX); 8 3/4 mi NW of Boerne, 24 May 1935, *Parks & Cory 14013* (BRIT, TEX, TAES); Uvalde Co.: Wooded slope at base of Old Baldy ca. 30 meters S of Frio River just above normal flood zone, [immature schizocarps and inflorescence], 18 May 2012, *Lloyd s.n.* (TEX), [mature schizocarps], 21 Jun 2012, *Lloyd s.n.* (TEX).

Etymology. The epithet refers to the white flowers, a unique feature of the genus. The other two species have yellow flowers.

Distribution and habitat. *Polytaenia albiflora* is currently known from the Balcones Canyonlands Subregion of the Edwards Plateau Natural Region in Texas (Diamond et al. 1987) (Figs. 3 & 4). The Gillespie Co. collection is from an unspecified location (Enchanted Rock) and date; therefore, it may represent a labeling error (Figures 3 and 4). If the collection was actually made at Enchanted Rock, then the species may be found in similar habitats in the Llano Uplift Subregion (Diamond et al. 1987). This species is apparently another of the approximately 36 endemic species restricted to the Edwards Plateau, including several that have been discovered recently. Recent discoveries include *Cardamine carrii* B.L. Turner, *Prenanthes carrii* Singhurst, O'Kennon, and W.C. Holmes, *Phaseolus texensis* A. Delgado & W.R. Carr, and *Galactia watsoniana* W.C. Holmes & Singhurst (Delgado-Salinas & Carr 2007; Diamond et al. 1987; Holmes & Singhurst 2008; Poole et

al. 2007; Turner et al. 2003; Turner 2012). This new species does occur with several endemic species and in close proximity to (but not with) *Cardamine carrii* in Garner State Park (Turner et al. 2003; personal observation).

At the type locality, the following species were closely associated with *Polytaenia albiflora*: *Celtis reticulata* Torr., *Tilia caroliniana* Mill., *Juniperus ashei* J. Buchholz, *Fraxinus albicans* Buckley, *Ungnadia speciosa* Endl., *Aesculus pavia* var. *flavescens* (Sarg.) Correll, *Sophora affinis* Torr. & A. Gray, *Tinantia anomala* (Torr.) C.B. Clarke, *Carex edwardsiana* Bridges & Orzell, *Dichanthelium pedicellatum* (Vasey) Gould, *Parietaria pensylvanica* Muhl. ex Willd., *Viguiera dentata* (Cav.) Spreng., and *Salvia roemeriana* Scheele.

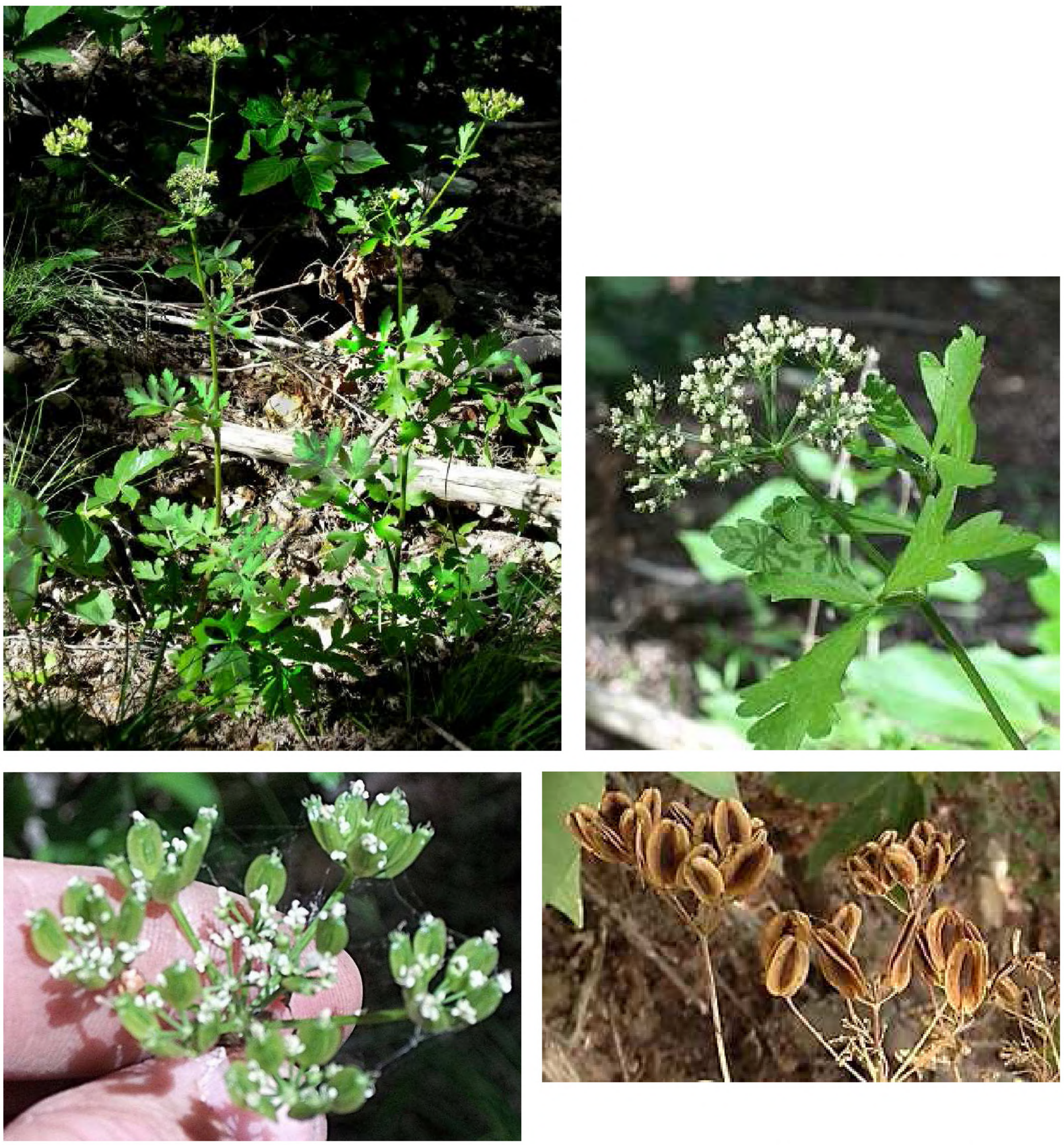

Figure 1. *Polytaenia albiflora*. Clockwise from top left: Habit. Inflorescence. Mature schizocarps (photo by Mike Lloyd). Immature schizocarps.

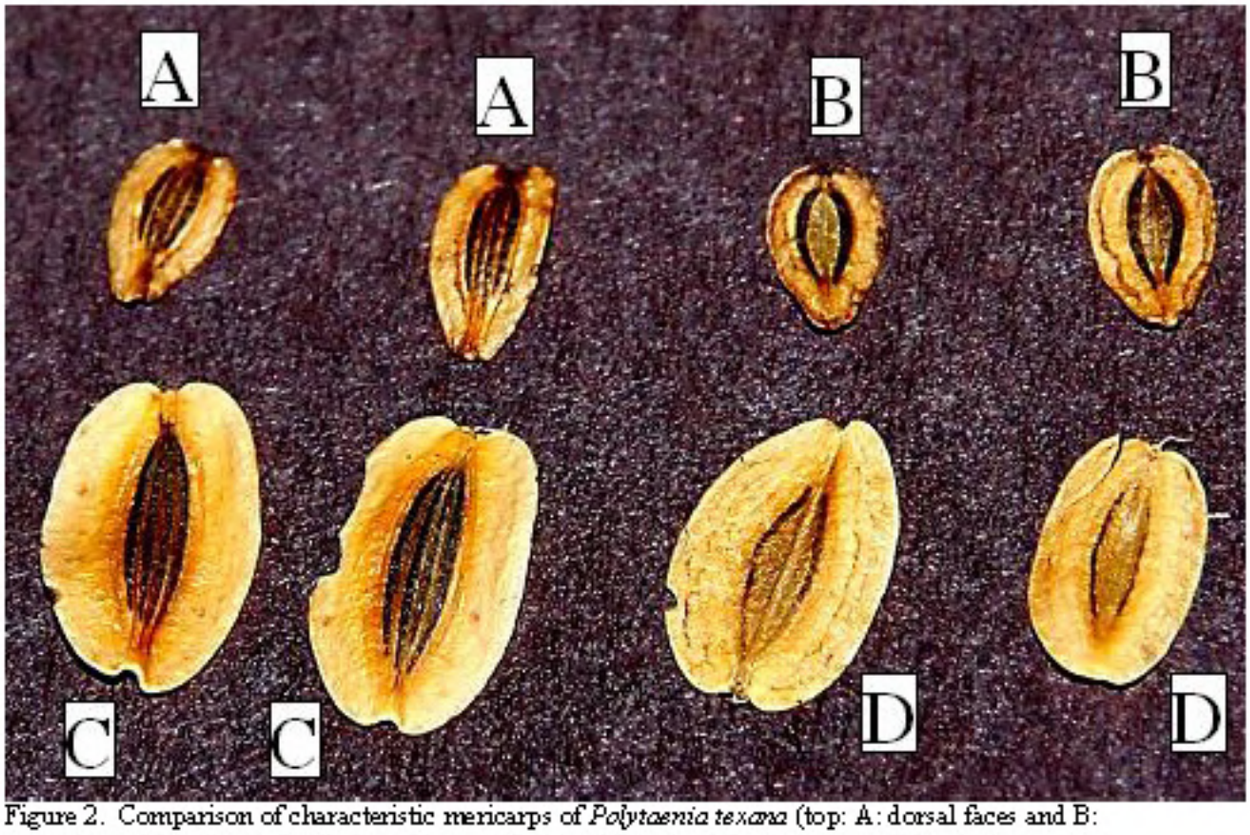

Figure 2. Comparison of characteristic mericarps of *Polytaenia texana* (top: A: dorsal faces and B: commissural faces) and *P. albiflora* (bottom: C: dorsal faces and D: commissural faces).

Relationships. The closest relatives of *Polytaenia* in subfamily Apioideae are species in the genera *Thaspium* and *Zizia* according to combined morphological and molecular analyses (Sun & Downie 2010). *Polytaenia* differs from these two genera by possessing narrow filiform or lanceolate involucel bractlets (or none in *P. albiflora*), dorsally compressed schizocarps with lateral ribs corky thickened into wings, and by dorsal and lateral ribs narrow and obscure (Coulter & Rose 1900; Michigan Flora Online 2011).

Polytaenia albiflora appears to be most closely similar to *P. texana* by its similar morphology and occasionally similar habitats, especially in the western portion of the range of *P. texana*. The two species are sympatric but are clearly separated by ecological preferences. *Polytaenia albiflora* appears to be restricted to mature forested slopes in shade and *Polytaenia texana* occurs most commonly in open areas such as prairies, old fields, roadsides, sandy alluvium along rivers, and openings in woodlands and oak-juniper slopes (Nesom 2012; personal observation). The nearest known population of *P. texana* to the Garner State Park population is approximately 35 kilometers north-northeast in adjacent Real County (Nesom 2012; Plant Resources Center 2012).

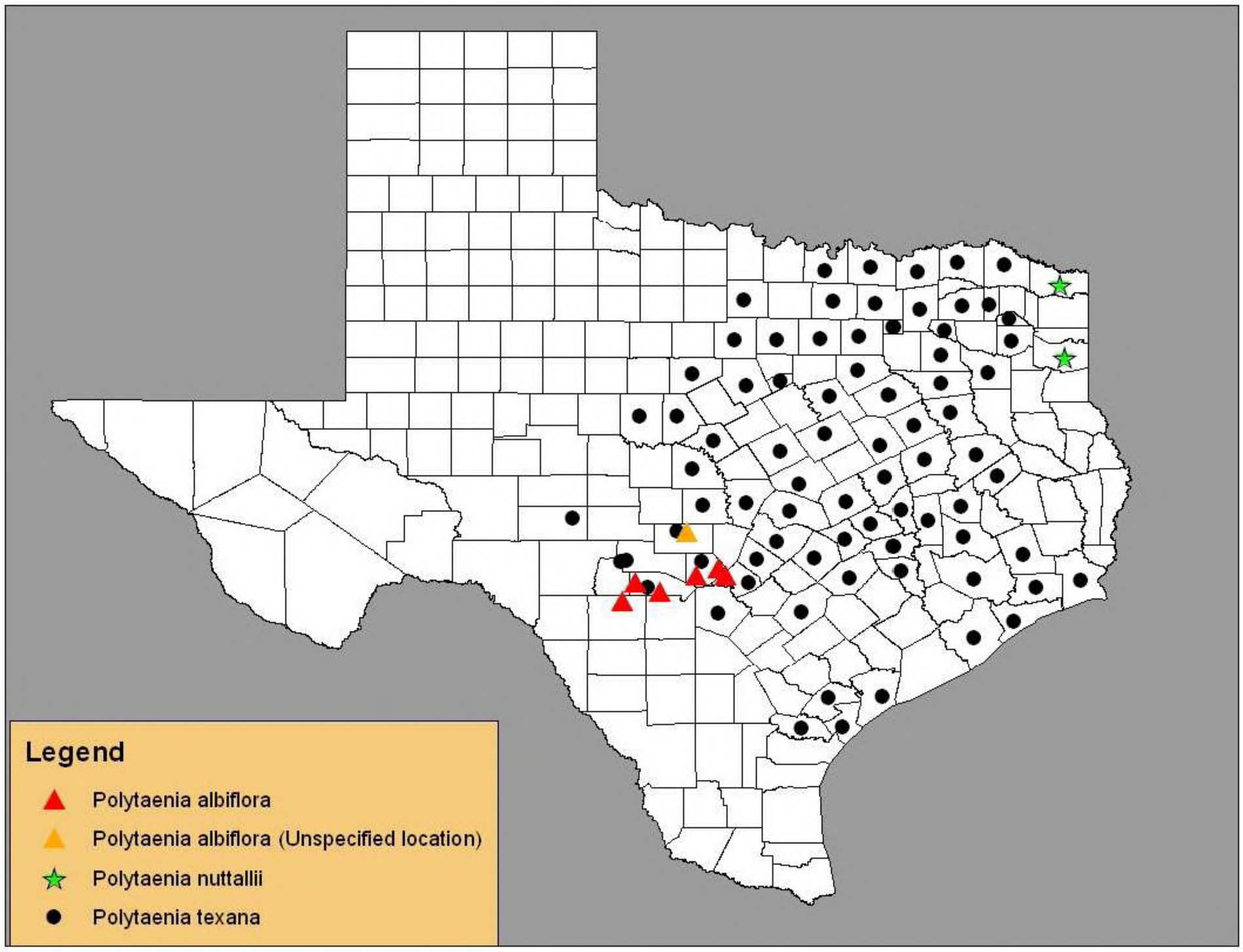

Figure 3. County distribution of *Polytaenia albiflora*, *P. texana*, and *P. nuttallii* in Texas, based on map in Nesom (2012) and collections from SHST, SMU-BRIT-VDB, TAES, TAMU, and TEX-LL.

A key to all three species of *Polytaenia* is derived from Nesom (2012) and personal observations.

1. Flowers white; plants to 8 dm in height; involucel absent or of 1–3 reduced lanceolate bractlets to 3 mm long; fruit (9–)11–15 mm x (6–)7–9.5 mm; forested rocky slopes; endemic to Edwards Plateau of Texas ..... **Polytaenia albiflora**

1. Flowers yellow; plants to 15 dm in height; involucel of linear or filiform bractlets usually > 4 mm long; fruit 5–11(–15) x 4–7 mm; mostly open habitats, widely distributed in Texas, north to Kentucky, Michigan, and Iowa.

2. Fruit 5–11 mm x 4–7 mm, lateral wings narrower and thicker than the body, oil ducts indistinct, several in the intervals; in sandy soil in the Timber Belt and the Blackland Prairies from Texas and Louisiana, north to Kentucky, Michigan, and Iowa ..... **Polytaenia nuttallii**

2. Fruit 9–11(–15) x 6–7 mm, lateral wings broader and thinner than the body, oil ducts distinct, solitary in the intervals; abundant on the Blackland and Coastal prairies and the Edwards Plateau; endemic to Texas and southern Oklahoma ..... **Polytaenia texana**

As currently understood, *Polytaenia albiflora* is endemic to the Balcones Canyonlands Subregion (or possibly including Llano Uplift Subregion) of the Edwards Plateau in Texas and is fairly uncommon (Diamond et al. 1987) (Fig. 4). Fortunately, at least two populations of *P. albiflora* are relatively protected in Garner State Park and Honey Creek State Natural Area. However, since this species appears to have a restricted distribution, it should be considered as a candidate for federal and state protected species status. Additional populations should be sought in similar habitats throughout the Edwards Plateau.

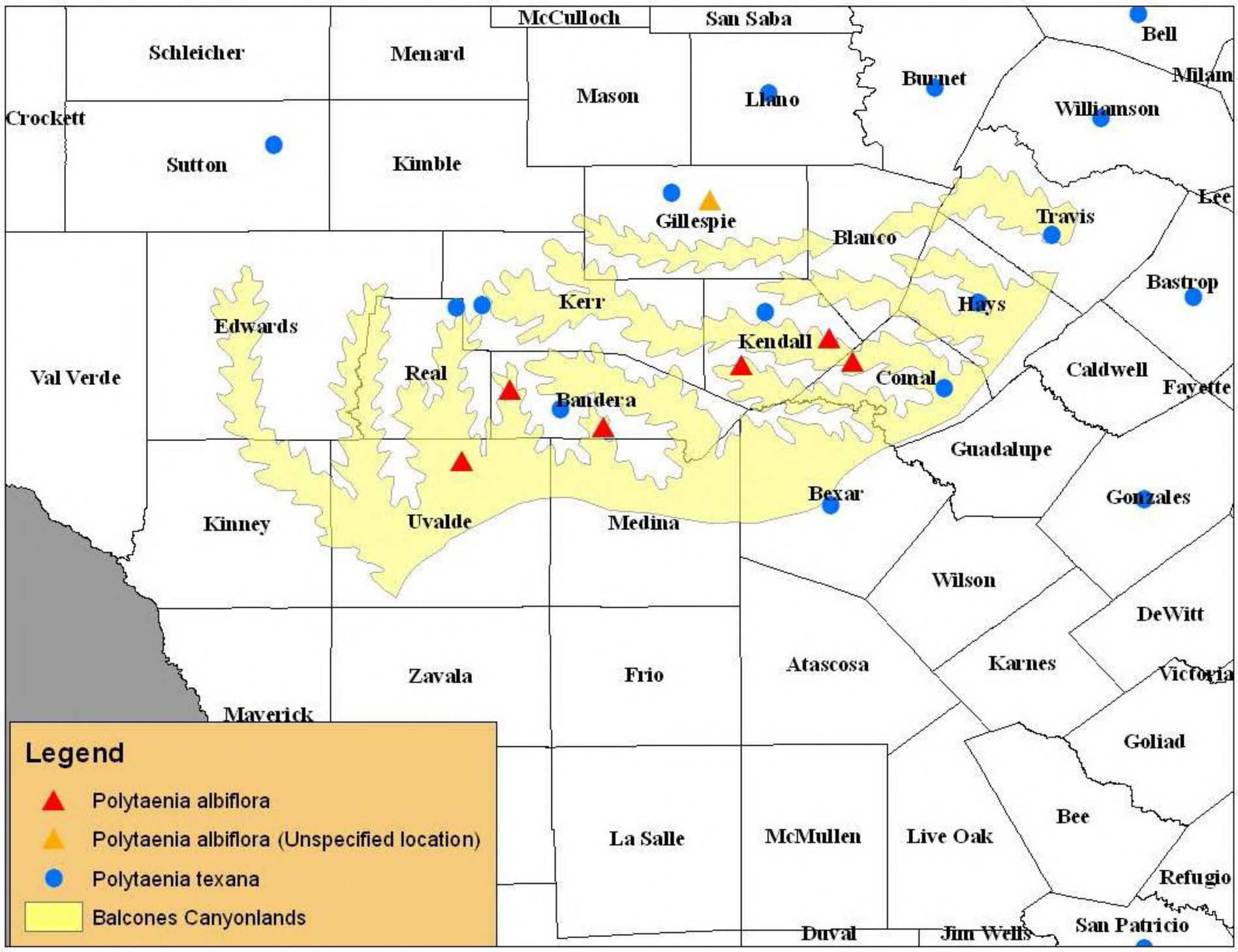

Figure 4. County distribution of *Polytaenia albiflora* and *P. texana* in Balcones Canyonlands Subregion and surrounding area, based on map in Nesom (2012) and collections from SHST, SMU-BRIT-VDB, TAES, TAMU, and TEX-LL.

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